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THREE LECTURES
ON THE
THEORY OF NATURAL
EVOLUTION,

DELIVERED IN

S. THOMAS' CHURCH, OOTACAMUND,

BY

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"Solis multi radii, sed lumen unum."—*St. Cyprian*.

"Felix qui potuit rerum cognoscere causas."—*Virgil*.

[Georg. ii., 490.]

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THE THEORY OF NATURAL EVOLUTION.

LECTURE I.

"And God said, Let us make man in our image, after our likeness : * * * So God created man in His own image, in the image of God created He him ; male and female created He them."—Genesis i., 26-27.

It is the glory and boast of science that it is founded on fact. Without this, the scientific investigator will accept no theory or dogma, supported though it be by antiquity, however venerable, by authority, however commanding, by belief, however universal. With a mind unwarped by prejudice, he sits down, and with the simplicity of a child asks nature what she has to teach. He does not care for imaginings, he wants to know what *is*. And it is to such as these, simple, earnest, honest searchers after truth, that Nature reveals her secrets. Thus we see the God of Truth says in Nature, as well as in revelation, to all searchers after truth, whether physical or religious, "If ye would be my disciples, ye must become "as little children."

In this spirit,—just the humble desire to know what is true,—I believe, many of the leading scientific men of the present day are interrogating nature. And most wondrously hath she responded to many of their queries, and lifted the veil from some of the most hidden mysteries to their ravished gaze. For example, the distance of the sun and the planetary system that owns his sway, has been measured with geometrical precision ; the fixed stars, which, by reason of their distance, glint like sparks of light in our heavens, are

shown to be bodies many times larger than our sun, self-luminous, revolving, each on its own axis, and themselves the centres of vast planetary systems. The very matter composing these distant bodies has been investigated. We now know the nature of the corona of the sun.¹ It is shown that at least nine of the sixty-four terrestrial elements are also solar elements ; some of which exist also in the fixed stars. Some at any rate, of the planets are surrounded with atmospheres, similar to that which invests the earth, and some of these are impregnated with aqueous vapour.

If we turn our gaze from these sublime objects, scattered through the fields of space, to the opposite point in the diameter of being ; if, I say, we fix our attention on those minute organisms, shoals of which freely sport themselves in a drop of water, as if in a mighty ocean ; the revelations of the power, the wisdom, the goodness of the Creator are none the less marvellous. We are lost in wonder and admiration, so that we may exclaim, with St. Augustine, "The Creator is great in great things, but greatest in the "most minute."

On all sides earnest-minded men are extorting her secrets from nature, and by means of observation, experiment and instruments, are building up scientific systems, the truth of which cannot be gainsaid. These accessions to our knowledge we thankfully accept. We know that truth cannot contradict itself. But, I venture to think, many scientific men are in too great a hurry to interpret their facts. The human mind frets itself when in doubt, it searches after that which is precise and definite, it would know the laws of nature. Impelled by this principle, no sooner is a fact discovered than some hypothesis is built upon it, not unfrequently, hasty generalizations and fanciful

¹ Somerville's *Molecular and Microscopic Science*.—Vol. i. p. 152.

theories, which have no other foundation than the baseless fabric of the imagination. The accomplished Professor Huxley, says, in his own felicitous language, that "extinguished theologians lie about the cradle of every science, as the strangled snakes beside that of Hercules." We do not care, by way of retort, to ask the Professor to point out a single science around which are not the dishonoured graves of rash speculators and mere theorists. It is true that hypothesis is necessary in the building up of any science. The shadowy hypothesis deepens into the theory, and this by-and-by solidifies into general laws. But, my hearers, that pioneer in science incurs a grave responsibility, who without due thought and consideration, enunciates theories that tend to undermine religious belief. For the unthinking masses accept his opinions as facts, and the intellectual stripling fancies he towers into grandeur, as he has his fling of insolent contempt at the most solemn verities of our holy faith.

Many scientific minds, schooled by the rigorous evidence of experiment and observation, find it difficult to accept theological dogmas not supported by similar evidence. The world of spirits is to them the world of dreamers, and heaven and hell but figments to allure or frighten people into being good. But it should be remembered, the science of religion, like every other science, has its own proper "organon," or "instrument." Its proofs differ from those afforded by balances and microscopes and chemical re-agents, yet are of such a character, and relate to subjects of such vital importance, as to entitle them to the thoughtful attention of reasonable minds.

The province of reason has to do with the *evidences* and not the *contents* of revealed religion ; such as the genuineness and authenticity of the documents ; the character of Him who professed to be divine ; the

credibility of those who assert He worked miracles ; the fulfilment of the predictions of a coming Messiah ; the rise and progress of the Christian religion, and the causes of its marvellous success.² Let us take one of these, the *Miracles of Christ*, and see within what limits reason should pursue her investigations. Says one, "Miracles are impossible." Who are we, that we should say what is, and what is not possible ? But, "The laws of nature are absolute and irrevocable. "We know that the stately movements of the planetary "system, that the alternation of the seasons, that even "the fitful hurricane, as well as the gentle breeze, are "just the fulfilment of certain fixed laws. We know "that there is no such thing as a catastrophe in nature. "How then can we suppose that these inexorable laws "have been violated ?" But how do we know that miracles do this ? How do we know that they do not come in "the march of nature's regularity ?" Reason has no authority to pronounce on the possibility of miracles. Her province is to weigh the evidence brought forward on their behalf.³ And so with all the truths of revealed religion. If the evidence be conclusive, and if in revelation we find truths that are beyond the limits of our powers of thought, then reason itself teaches the existence of truths beyond reason, and justifies our belief of the inconceivable. Such, for example, as the doctrine of "One God in Trinity, and Trinity in Unity," and that our Lord and Saviour Jesus Christ was both God and man. The Christian philosopher then brings the same power of observation, the same rigorous method of investigation, as he employs in his physical studies, to the examina-

2 Mansel's "Limits of Religious Thought," page 152.

3 There is a thoughtful article on Miracles in "Smith's Dictionary of the Bible." It passes over the important historical evidence in their favor. This is an omission much to be regretted. What is required is, not so much proof that miracles *may* take place, but that they *did* take place.

tion into the authenticity and inspiration of Divine Revelation; but his reason stands abashed in the presence of the Absolute and Infinite, and gives the highest proof of its vigour in believing what it does not understand.

With these introductory remarks, I pass on to consider the "Theory of the Natural Evolution of Man."

Although Ethnologists are still divided in opinion, many of the most eminent among them believe in the *unity* of the human race, and that the different families of man, are like so many streams divergent from one spring. Whether the varieties of man, existing at the present time, on the earth, can be traced up to Adam as their common progenitor; whether, according to the emphatic teaching of Geology, he was not the first man; and whether at the time of his first appearance on earth, there were other collateral branches also, descendants of pre-adamite ancestors, are questions which we have not now to consider.

The point we have now to discuss is the origin of *Man*, not Adam. The Scriptures represent the origin of man as the result of a distinct act of creative energy. "And God said, Let us make man in our image, after our likeness. So God created man in His own image, in the image of God created He him. And the Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life; and man became a living soul." According to these words, at a given time and place, by a creative act of the Almighty, man, who before was not, came into existence, endowed with such excellent qualities as are implied in being made in the image of God. But modern science says, No! this cannot be. There is evidence to prove that man is one of a series—is but the crown and summit of a majestic ladder of development, descending which, by almost infinite gradations, we come to a monad or simple vesicle.

You will observe this theory does not exclude the idea of a Creator. On the contrary, there is an ineffable grandeur in the suggestion that the great First Cause has indued a simple body with such properties, that according to certain fixed and unalterable laws, it shall gradually develop into organisms, more and more complex,—ever advancing to a higher and yet higher state, until the whole culminates in a being possessed of self-consciousness, of a knowledge of right and wrong, and of a power of discerning and adoring the wisdom and the goodness of that Being, who projected the whole into existence.

It is maintained that man and the higher animals have, by a process of what is called “Natural Selection,” been gradually evolved from creatures in a lower scale of being than themselves.

It is shown both by anatomical and physiological considerations that man is structurally and functionally similar to other vertebrates.⁴

This proves that man is an animal, whose *body* is built up on the same general principles as that of the other members of the same sub-kingdom. It shows uniformity of design and the unity of the Designer. But it throws little light on the doctrine of evolution; not any more than the observation, that a piston, pipes and valves are common to all steam-engines, whether used for agricultural, locomotive or manufacturing purposes.⁵

It is observed that certain parts, though performing different functions, have a similar structure: *e.g.*, the arm of a man, the foreleg of a horse, the wing of a bird, the flipper of a seal, are all built on the same plan. Homology, then, it is asserted, teaches the theory of development. But I appeal to any anatomist,

⁴ Descent of Man.—Vol. i, p 10.

⁵ Vide Appendix.

whether homology would not just as forcibly support an opposite theory : viz., that the lower animals are a proof of retrogression of being, are in fact degraded descendents of humanity. An argument that gives its support to both sides of a question, can have little weight when alleged in favour of one.

And here I would mention an interesting physiological fact, which Mr. Darwin does not notice. The blood-corpuscles of all mammals are small, round, bi-concave discs, with one strange exception,—those of the order Camelidæ, which are oval. The blood corpuscles of birds, reptiles and fishes are also oval. Now, according to the theory we are discussing, how are we to account for this abrupt transition from oval to round corpuscles? Are we to suppose that the camel is the last in the order of development, and has not yet attained the perfection of a mammal?

Further, let us look for a moment at the system of development, which is not a theory, but which actually goes on before our eyes, and is within our cognizance. All organisms in their earliest stage are indistinguishable. They lie entombed in a mystery, which no means at present within our reach can bring to light. Whether that little vesicle shall develope into a lichen, clinging to the clammy rock, or into a majestic tree to adorn a landscape, or into one of the Algæ, to bloom in the garden of the ocean; whether it is the germ of the gigantic elephant, or only of the parasite which preys upon it, who shall say? But the moment—and this is the point to be noticed—the moment the slightest differentiation takes place, the riddle is solved, the type is displayed, and each organism, by laws which no circumstances can alter, arranges itself infallibly in the sub-kingdom to which its progenitors belonged.

Whether we accept Cuvier's division of the animal kingdom into four, or that of more recent zoologists,

into six sub-kingdoms, we fail to discover one fact to warrant the belief that the member of any one sub-kingdom has ever passed by its descendents into another. Where is it shown that an animal of radial growth has developed into one of linear growth ; that a non-vertebral mollusc has developed into a vertebral creature ? The awful chasm has not yet been bridged over. Gradation is not connexion, contiguity is not continuity, approximation is not amalgamation.

We may go a step further : so far from there being any evidence of the development of sub-kingdom from sub-kingdom, of genus from genus, we have no proof of the evolution of even distinct species from distinct species. Professor Huxley writes "after much consideration, and with assuredly no bias against Mr. Darwin's views, it is our clear conviction that, as the evidence stands, it is not absolutely proven that a group of animals, having all the characteristics exhibited by species in nature, has ever been originated by selections, whether artificial or natural. Groups, having the morphological character of species, distinct and permanent races in fact, have been so produced over and over again ; but there is no positive evidence, at present, that any group of animals has, by variation and selective breeding, given rise to another group, which was even in the least degree infertile with the first. Mr. Darwin is perfectly aware of this weak point, and brings forward a multitude of ingenious and important arguments to diminish the force of the objection, * * * but still, as the case stands at present, this little 'rift within the lute' is not to be disguised nor overlooked." The fact is, naturalists,—even Mr. Darwin himself—are becoming more and more convinced that the doctrine of natural selection fails to explain many of the most important phenomena connected with the origin of species.

Now how does Mr. Darwin fill up these gaps in his evidence? Simply by speculations. Enormous assumptions are based on what *may* have been. Take, for instance, the summing up of his chapter on Affinities and Genealogy.⁶ He writes, "The most ancient progenitors in the kingdom of the vertebrata, at which we are able to obtain any obscure glance, *apparently* consisted of a group of marine animals, resembling the larvæ of existing Ascidians. These animals *probably* gave rise to a group of fishes, as lowly organised as the lancelet; and from these the Ganoids, and other fishes like the Lipidosiren, *must* have been developed. From such fish a *very small advance* would carry us on to the amphibians. We have seen that birds and reptiles were once intimately connected together; and the Monotremata now, in a slight degree connect mammals with reptiles. But *no one can at present say* by what line of descent the three higher and related classes, namely, mammals, birds and reptiles, were derived from either of the two lower vertebrate classes, namely amphibians and fishes. In the class of mammals the steps are not difficult to *conceive* which led from the ancient marsupials; and from these to the early progenitors of the placental mammals. We may thus ascend to the Lemuridæ; and the *interval is not wide* from these to the Semiadæ. The Semiadæ then branched off into two great stems, the New World and Old World monkeys; and from the latter at a *remote period*, man, the wonder and glory of the universe, proceeded."

My hearers! what is the value of scientific evidence such as this? Is the Baconian system to be discarded, and are we to return to the Ptolomaic system of cycles and ether, in which every new opponent may be met by a new speculation? Given an unlimited period and unknown causes, what theory may not a lively

6 Descent of Man. Vol. i., p. 212.

imagination evolve ? “ The proper scientific mood is the indicative. Science tells us what has been, what is, and shall be. But Mr. Darwin’s argument is a continuous conjugation of the potential mood. It rings the changes on ‘can have been,’ ‘might have been,’ ‘should have been,’ ‘would have been,’ until it leaps with a bound into ‘must have been.’ ”

It is for these reasons, we are unable to accept a theory whose assurances are hypothetical, whose deductions are but splendid guesses. It is for these reasons, we receive with some incredulity the story of a drama, which is said to have been going on for hundreds of thousands of years ; and yet about which, up to the present time, geological history has no record, and to which existing facts give no attestation.

In conclusion : many have been the attempts to reconcile this theory with the account of the creation of man recorded in the book of Genesis. Some have, perhaps, too rashly put forth their hand to save the “ Ark of the Lord.” This I venture to think, is premature. The theory is confessedly only tentative. No one knows this more thoroughly than the respected author himself, than whom no one, we believe, more honestly desires to know what is *true*, be it this or not. But before this theory become an established truth. many missed links must be supplied, and many difficulties solved. Shall we not be pardoned, if under these circumstances, we show no eagerness to loosen our hold of the interpretation of Scripture which our fathers believed, and which they handed down to us ? The time may come, when it may be necessary for us to do so, but that time has not, we think, come as yet.



LECTURE II.

THE MENTAL AND MORAL FACULTIES.

"And God said, Let us make man in our image, after our likeness : * * * So God created man in His own image, in the image of God created He him ; male and female created He them."—Genesis i., 26-27.

Even granting that man's body may have been derived from brutes, are we to suppose that his brilliant mental faculties, that his knowledge of right and wrong, that his sense of purity and holiness, that his imperative impulses to worship and devotion, have sprung from germs inherited from the lower animals ? Mr. Darwin, to give completeness and perfection to his theory, answers these questions in the affirmative. According to him, man differs in no essential way from the beasts. "There is no fundamental difference between man and the higher mammals in their mental faculties."¹ "The first foundation or origin of the moral sense lies in the social instincts, including sympathy ; and these instincts no doubt were primarily gained, as in the case of the lower animals, through natural selection."²

I. *The Intellectual Faculties.*—We read much of the sagacity of dogs and elephants, of the ingenuity of beavers, of the geometrical skill of bees, of the political economy of ants ; how is it that according to this theory of progressive evolution, the anthropoid apes do not stand out with pre-eminence in intellect, as they do physically ?

¹ Descent of Man. Vol. i., p. 35.

² Vol. ii. p. 394.

Other things being equal, the intellectual powers bear a certain ratio to the size of brain.³ The average cranial capacity in man varies from 94 cubic inches in the Teutonic race, to 77 cubic inches in the Bushmen, whilst in the Gorilla, which has the largest brain amongst the Quadrumana, it reaches only $34\frac{1}{2}$ cubic inches, *i.e.*, about half the size of the lowest and about one-third the size of the most advanced of the human races. Of this enormous and abrupt difference Mr. Darwin takes no notice. Further, we find that many of the savage races possess mental powers, far in excess of their daily requirements. These faculties are dormant, but that they exist is evident from their manifestation under the influence of civilization, education and religious training. These people then have faculties beyond their needs,—faculties unused in their struggle for existence, and therefore unaccounted for by the theory of natural selection.⁴

The lower animals, like man, manifest feelings of pleasure and pain, of happiness and misery. They are excited by the same emotions as terror, suspicion, courage, timidity, love, hate, revenge and jealousy.⁵ Some animals, as the horse, show emulation, others imitation, whilst many show attention, and a certain amount of reasoning: so that even with respect to the *kind* of mental constitution, there is much in common between man and the lower animals. But, *in addition* to these, man possesses self-consciousness and the power of abstract reasoning. No facts yet adduced

³ From the observation that Napoleon, Cuvier, and a few other men, eminent for intellectual vigour, had large brains, too much stress has been laid by some writers, I venture to think, on the connection between the intellect and the size of the brain. Sir Isaac Newton was a seven month's child; so that most probably his brain was not above the average. On the other hand, many people with large brains have ordinary abilities. There is little doubt brain substance differs in *quality* as much as it does in *quantity*.

⁴ Wallace's Contributions to Theory of Natural Selection, p. 342.

⁵ Descent of Man. Vol. i., pp. 39-43.

will justify the belief that these last two are possessed also by the lower animals. Just as animal and vegetable organisms perform in common the functions of assimilation, growth and multiplication, whilst the former is distinguished by having sensation and the power of locomotion, which the latter have not; so man and the lower animals have in common certain affections and emotions; but their mental constitution differs in the one having and the other not having self-consciousness and the power of abstract reasoning.

It is of importance to observe that exactly the same class of actions may be performed by man and the lower animals; by man prompted by reason, by the lower animals under the impulse of instinct. As Mr. Darwin himself says, "We may easily underrate the mental powers of the higher animals, especially of man, when we compare their actions, founded on the memory of past events, on foresight, reason and imagination, with exactly similar actions instinctively performed by the lower animals; in this latter case the capacity of performing such actions having been gained, step by step, through the variability of the mental organs and natural selection, without any conscious intelligence on the part of the animal during each successive generation."⁶ Surely with such an admission as this, it is hazardous to argue that animals have the same feelings as we have, when they do the same class of actions.

Mr. Dugald Stewart thus distinguishes Instinct from Reason: "In Instinct we observe, 1st, The uniformity with which it proceeds in all individuals of the same species; 2nd, The unerring certainty with which it performs its office prior to all experience. In both these respects the operations of Reason seem to be essentially different from

⁶ Descent of Man. Vol. i., pp. 38-39.

“anything else that is known in animated natures; “inasmuch as no two individuals of our species were “ever observed to employ exactly the same combination of means, for the attainment of the same “ends; and as the capacity of reason, destitute of the “aid of experience, is altogether a barren and “unavailing principle.”⁷ Man has to learn his work; with him practice makes perfect. The artizan attains his skill only after many failures, and by much labour. Not so with the beaver, the bird, the bee; their constructive skill is as perfect, or nearly so, the first effort they make, as any subsequent to it. As observed by Dr. Reid, the curious mathematical problem, at what precise angle the three planes which compose the bottom of a cell in a honey-comb ought to meet, in order to make the greatest saving, or the least expense of material and labour, has been resolved by mathematicians by means of fluxionary calculation. And it has been determined by exact mensuration, that it is the very angle in which the three planes in the bottom of the cell of a honey-comb do actually meet. Shall we ask who taught the bee the properties of solids, and to resolve problems of maxima and minima? We need not say bees know none of these things. They work geometrically without the knowledge of geometry. The geometry is not in the bee, but in that great Geometrician who made the bee, and made all things in “number, weight and measure.”⁸ The bee *by instinct*, mathematicians *by reason*, both arrive at the same result.

Another important hiatus occurs in the chain of development, and that is, the possession by man alone of artificial articulation, speech. There seems some slight confusion in Mr. Darwin’s work as to the origin

⁷ Dugald Stewart’s Works, edited by Sir W. Hamilton, Bart. Vol. iv., p. 251.

⁸ *Id.* p. 269.

of this faculty. In vol. 1. p. 54, he attributes it to the development of the mental faculties. "It is not the "mere power of articulation that distinguishes man "from other animals, for as every one knows, parrots "can talk; but it is his large power of connecting "definite sounds with definite ideas; and this obviously "depends on the development of the mental faculties;" whilst in vol. ii., p. 391, he attributes the development of the mental faculties to the use of language: "The "large size of the brain in man, in comparison "with that of the lower animals, relatively to the size "of their bodies, may be attributed in chief part, as "Mr. Chauncy Wright has well remarked, to the "early use of some simple form of language." Without giving the slightest reason for the supposition, our author thus speculates on the transition from instinctive cries to articulate speech, in the evolution of man's intellectual faculties: "It does not appear "*altogether incredible*, that some unusually wise ape-like animal should have thought of imitating the "growl of a beast of prey, so as to indicate to his "fellow-monkeys the nature of the expected danger. "And this would have been a first step in the "formation of a language."⁹ Such a view is not altogether inconceivable to a fertile imagination; but we ask for something more substantial as the ground of our belief. According to Max Muller, the origin of language is still wrapt in mystery; and we are not willing to accept this explanation of the difficulty.

Further, if we step from the domains of an indefinitely remote period, the evidence for events and changes in which we must necessarily receive and weigh with severe caution; if, I say, we pass from unknown time into the historical period, we fail to find any support to the idea of progressive develop-

⁹ Descent of Man. Vol. i., p. 57.

ment. Is it not passing strange that whilst "some unusually wise ape-like animal" should have bestowed on man the splendid endowment of speech, no other creature should have made the faintest attempt to bestow the same blessing on others in whom they were most interested? How is it not one of the lower animals has even attempted to form articulated speech? "They are capable of articulation we know; speech to warn others of danger, or to make known their wants, would have been of immense service, and yet not one family has attempted to form artificial articulation."

But we do not see any signs of progression even in the intellect of man. Though we have the benefit of the ever accumulating experience of bygone ages; though each successive cycle has left to us a rich legacy; though the march of civilization has made luxuries to become necessities, and by means of various appliances, has multiplied our intellectual resources a thousand-fold, we have no reason to believe that mental vigour and power are any greater than they were in olden times. Our poetry, our fine arts, our philosophy, these only are commended as they approach the nearer to those of the ancients.

We have seen that no explanation is offered of the immense difference in the cranial capacity of man and the most advanced anthropoid apes; that whilst the lower animals have, in addition to instinct, certain reasoning powers, no facts are adduced in proof that they possess self-consciousness and the power of abstract reasoning; that man alone possesses artificial articulation; that this is accounted for by a guess, which cannot be regarded as scientific evidence; and that observations within the historic period do not support the idea of progressive development. For these reasons we conclude, that evidence is still

wanting to show that the intellectual faculties of man have been derived from those of the lower animals.

II. *The Moral Faculties*.—It is necessary that we should have, first of all, clear and definite notions as to what constitutes a moral action. We all know that we possess certain affections and emotions. We also know that we attach certain qualities to these,—a rightness or wrongness. We say such an action is good or bad, virtuous or vicious, worthy of praise or blame. The science which has to do with our emotions and affections is called Mental Philosophy; that which has to do with the rightness or wrongness of these is called Moral Philosophy. An action which we OUGHT to do, is a moral action; an agent who feels that he OUGHT to follow a certain course of action, is a moral agent. What stern emperor is enthroned in the human breast, at whose imperious bidding, a man will sacrifice self-interest, nay, oftentimes life itself; who rewards obedience with exquisite felicity, and punishes disobedience with regret, and oftentimes with a poignant remorse that knows no peace or rest? Why should a moral agent feel *bound* to a certain course of action? Are there such qualities as abstract right and abstract wrong? These questions have received many different answers: some say an action is good only because it is useful to society at large; others say, an action is good because God has willed it so; whilst a third class of philosophers maintains that an action is good only so far as the motives prompting it resemble the nature of God: *i.e.*, the difference between right and wrong is not arbitrary, but essential, and arises out of the nature of the case.¹⁰

1. It has been observed that the tendency of virtuous actions is to be useful to society at large. Hence it has been inferred that *utility* is the found-

10. *Vide* the article on Psychology, in the Encyclopædia Britannica.

ation upon which rectitude is based; and that the disposition to be useful to one's fellow-creatures is virtue. This is called the Utilitarian Theory, and is supported by Hume, Paley, Bentham, Mill, Herbert Spencer, and others. That a right course of action in individuals is of benefit to society at large few will deny. But the question is, which is the cause, and which the effect? Is an action right because it is useful, or is the utility an essential and necessary outcoming from the right action? Is utility the root or the fruit of a right action? According to this theory a moral agent is one who does a useful action. But a steam engine does this; is it therefore a moral agent? "Oh!" replies the Utilitarian, "the action must be *voluntary*!" "So then, what constitutes virtue is not mere utility, but utility *plus* a voluntary and intelligent choice. "But virtue cannot be placed in mere choice; it can be found only in the *reasons* which have guided that choice. It follows, that in these reasons, and not the mere utility of the act, the element of its "virtuousness must be sought."

2. Another theory is that there is no abstract difference between right and wrong—that the difference is merely arbitrary, depending on the will of God—that actions are virtuous or vicious only because He has ordained them so. Descartes, in upholding this opinion, says, "God did not will the three angles of a triangle to be equal to two right angles, because He knew it could not be otherwise; but because He willed the three angles of a triangle to be necessarily equal to two right angles—therefore this is true, and cannot be otherwise." Not many will be found to agree with Descartes, that even necessary truths are dependent on the will of God. Whether God's will *creates* the difference between right and wrong, or not, we cannot suppose that He would will anything to be

right that is opposed to His own attributes. So that an "action is right, not because God wills it right, but "because it is right He should will it."¹¹ Bishop Butler, in the first chapter of the second book of his *Analogy*, very clearly distinguishes between moral and positive laws. "*Moral* precepts are precepts the "reasons of which we see; *positive* precepts are "precepts the reasons of which we do not see. Moral "duties arise out of the nature of the case itself, prior "to external command. Positive duties do not arise "out of the nature of the case, but from external "command; nor would they be duties at all, were it "not for such command, received from Him whose "creatures and subjects we are." According to this distinction, a positive law is a law laid down for special purposes, and corresponds to statute laws. Thus the "Local Funds Act" depends for its force upon the will of the Legislative Council, and when repealed is binding no more. But a moral law is binding for ever, and can neither be made nor unmade.

3. And this leads me to the third and last theory to which I shall allude, and which I believe to be the true one; *viz.*, that the foundation of rectitude is not in the *will* but in the *nature* of God. Love, truth, goodness, purity, are not so much qualities; they go to make up the *essence* of what we conceive to be the Deity. God is Truth, God is Love, God is Goodness, God is Purity. And therefore is it that man is endowed with such a moral constitution, as that the more nearly he fulfils its dictates, the more nearly does he approach the character of the Almighty. But how are we to know the nature of God? How are we to know what is the standard of rectitude? Our eye cannot see the Invisible; our

11. *Vide* the article on Psychology, in the *Encyclopædia Britannica*.

infantile mind cannot comprehend the Infinite and Absolute. It is only so far as God manifests His nature to us, that we can know what that nature is. Now we find the Almighty has, to some extent, shadowed forth His character in the book of nature, in a written revelation, and in the moral constitution of man. And just as the master artist presents his own appropriate marks in every work he does, so that the connoisseur recognises the cunning of the hand, however diverse the subject may be, so we may trace the same mighty Intelligence throughout the infinite varieties in nature, in revelation, and in morality. And,—to continue the simile, feeble though it be,—as from their works we can, to some extent, form an opinion of the character of the artists,—*e.g.*, Rubens was sensuous, whilst Raffaele was elevated and *spirituel*; so in the works of God we see not only His power and wisdom, but His goodness and beneficence. It does not belong to our present subject to look in the universe for proofs of the wisdom of the Creator. If it did, it were not difficult to find them. Whether we look at the simple laws of gravitation and motion, which the planets in their majestic course obey, or whether, in the organic world, we look at the collocation of parts, and the marvellous adaptation to the laws under which they exist, we have proofs overwhelmingly convincing of the wisdom of God. If we look, for instance, at the eye, prominent and yet shielded, with its marvellous machinery for motion; its curtain, which automatically folds up and expands; its lens, which adapts itself to near or distant objects; its retina, which is so delicate as scarcely to be visible, and yet is composed of seven distinct layers; its strangely mysterious connection with the brain, by which sensation and perception are evoked, and this with the circulation; the dependence of this on the

food we eat, which associates the brilliance and vivacity of the eye with the vegetation around us, nay, with the very inorganic substances which form our earth. In this, and in every thing else, do we see proofs of design, and of an intelligent First Cause. Our present concern is rather to see whether nature can tell us anything of the moral attributes of God.

We notice the unerring certainty with which nature's laws are fulfilled. Infinitely various, infinitely complex, they know no clashing, no interruption. Relying on their immutability, we daily commit ourselves to the mercy of the most destructive agents; nay, we enslave these, and make them do our bidding, knowing they cannot burst through the restraints of law. Thus the assurance of the constancy of nature's laws assures us of the fidelity, changelessness, and truthfulness of their Promulgator. But, further, we cannot break any of nature's laws with impunity. Suffering is the essential out-growth of every infringement. An inexorable justice dogs the footsteps of every transgressor. "Whoso breaketh an hedge, a serpent shall bite him."¹² If we violate the laws of health, sickness, premature decrepitude, or death, are the penalties we have to pay. If we put our finger in a flame, we are burnt and suffer. Thus, my hearers, does nature teach us the unswerving justice of the Creator.

Not less loudly does she proclaim His beneficence. Look at the means provided for the preservation of organic life. The air we breathe out from our lungs is loaded with carbonic acid gas. This is so deadly a gas that if we breathed it unadulterated for fifteen seconds we could not recover. How then is it the air does not become

12. Ecclesiastes x., 8.

saturated with it? The fact is, that what is so deadly to us, is essential to, and is eagerly absorbed by vegetation. If this gas were lighter than atmospheric air, it would speedily ascend beyond the reach of the trees; if it were of the same density, it would mingle with the air, and but little could be absorbed; but it is heavier than air, and so sinks down and lingers about the surface of the earth, until absorbed by herbs, and shrubs, and trees. Thus the balance of health, both for animals and vegetables, is preserved in the atmosphere. Or, look at the beneficent plan for the preservation of the inhabitants of water. Bodies expand with heat, and contract with cold. Water follows this law only to a certain point, contracting as its temperature sinks to $39^{\circ}5'$ Faht.; it then suddenly begins to expand, as it sinks to freezing point. Were it not for this simple and exceptional arrangement, Europe would probably be uninhabitable, the deep lakes of America would be frozen throughout, and every inhabitant of the waters would perish on the advent of the first severe frost. And if we notice how the Almighty, with a God-like munificence, has scattered over the earth objects—not indeed necessary to our well-being,—solely adapted to gratify our senses, we find that nature, with ten thousand voices, proclaims the beneficence of the Creator.

Thus we find that nature does, to some extent, it may be faintly, as in a “glass darkly”—reflect some of the moral attributes of the Diety.

“These are Thy wondrous works, Parent of Good,
 Almighty, Thine this universal frame,
 Thus wondrous fair, Thyself how wondrous then,—
 Unspeakable! Who sittest above these heavens,
 To us invisible, or dimly seen
 In these Thy lowest works; yet these declare
 Thy goodness beyond thought, and power Divine.”

Let us now turn for a moment to Divine Revelation. Let us search the Scriptures, for they are they which testify of Him. In them we find clearer and more manifest illustrations of God's attributes than in the book of nature. As Rollin observes, of the facts recorded in the Word of God, they are "so many keys to open to us the path to "the secret method by which He governs the world "and us." "God is not a man, that he should lie; "neither the son of man that He should repent." Numbers xxiii, 19; 1 Sam. xvi, 29. "I am the Lord, I change not." Malachi iii, 6. "Faithful is He that calleth you, who also will do it." 1 Thess. v., 24. Would you learn the inexorable justice of the Almighty? Look at the severity with which the Canaanites were punished for their idolatry; and how, in their turn, the curse of God is impressed on the Jewish nation, who, for having become a God-forsaking people, became a God-forsaken people. And yet, as a proof that severity is mingled with compassion in God's moral government, compare together the prophecies of Nahum and Jonah, both of which relate to the destruction of Nineveh. "The Lord is righteous in all His ways, and holy in all His works." Psalm cxlv., 17. "Thus saith the high and lofty One, that inhabiteth eternity, Whose Name is Holy." Isaiah lvii., 15. "I am the Lord your God; ye shall therefore sanctify yourselves, and ye shall be holy; for I am holy." Lev. xi., 44. "And every man that has this hope in him purifieth himself, even as He is pure." 1 John iii., 3. "He that loveth not, knoweth not God; for God is love." 1 John iv., 8. "God so loved the world, that He gave His only begotten Son, that whosoever believeth in Him should not perish but have everlasting life." John iii., 16. It is in this last,—the gift of His Son, in the example of our blessed

Saviour's most holy life, in the love and justice, the hatred of sin and compassion for the sinner, which cluster around the sacred Cross ; it is thus, I say, that God has most clearly expressed His own character. That same character, which is dimly outlined by nature, is filled in by divine revelation, so that we may repeat, God is Love, Truth, Justice, Mercy, Purity !¹³

It is found that precisely the same attributes which are made known by nature and revelation, as belonging to God, constitute virtues in the moral constitution of man. All races of men have some sense of duty, that is, an idea that they *ought* to follow a certain course of action. Enthroned in our nature is an arbitrator of our actions, filling the mind with complacency when we do right, and with uneasiness when we do wrong ; and so causing joy or sorrow, as we approach or depart from the character of the Author of our moral being. It is true, the mad passions may rise in riot, and refuse to obey the dictates of the monarch. It is true, the commands of conscience may be unheeded, so that when its voice says "Thou shalt not," godless hardihood says "I will." But might does not make right. It is true that national custom, education, enthusiasm, fanaticism, may pervert or misinterpret its dictates ; and that neglect often repeated will produce a passive habit of indifference, so that the mandates of conscience are as undisturbing of the false security, as are the murmurs of the wave breaking on the distant shore. Still, in spite of all the immorality which pervades society, both civilized and uncivilized,

13. Dangerous it were for the feeble brain of man to wade far into the doings of the Most High : Whom although to know be life, and joy to make mention of His Name, yet our soundest knowledge is to know that we know Him, not indeed as He is, neither can know Him ; and our safest eloquence concerning Him is our silence, when we confess, without confession, that His glory is inexplicable, His greatness above our capacity and reach. He is above, and we upon earth ; therefore it behoveth our words to be wary and few."—Hooker's Eccles. Pol., Book i., Sec. 2.

no one can deny that conscience is on the side of virtue, approving of those qualities which are a primeval attribute of God Himself. Thus we see that nature, revelation, and morality, with one consentient voice, point to the *nature* of God, as the true basis of the standard of rectitude.

We have now to ask the question, What constitutes a moral action? The sight of suffering, in any form, awakens feelings of compassion, and, perhaps, the desire to relieve. Many people seem to be content with this. They indulge in a sort of "weeping sentimentalism," which is quite inoperative. They feel pity for misery; they do not seek to alleviate. There is nothing more fatal to the formation of vigorous moral habits than this ineffective play of the emotions. For feelings which do not issue in action, blunt the moral sense the more frequently they are indulged in.

The first essential of a moral action is that it be voluntary. A man overpowered and forced by another to some illegal or immoral act, is no more guilty of crime than is the weapon in the hand of an assassin. And, further, a moral act is not only voluntary, but is prompted by a sense of duty. It must spring from a feeling that we ought to do it. Three persons relieve a man in distress. The one out of anger, and to get rid of the importunity. The second from ostentation, and the desire of admiration for his charity. The last impelled by a feeling of pure benevolence, and by a sense of duty. All three equally benefit the recipient; but the actions of the first two are immoral, whilst that of the last only is moral, and worthy of praise. A moral act, then, is one that we do voluntarily, and from a sense of duty.

Does not the mystery that has been hanging about the words of my text begin to dissolve? Do

we not begin to see the meaning of the words "So "God created man in His own image, in the image "of God created He him." The divinity in man consisted of those moral attributes of which we have been speaking. It is true the image has been defaced, and almost effaced, by sin. "Lo, this only have I "found, that God hath made man upright; but they "have sought out many inventions." Eccles. vii., 29. The temple of the soul is in ruins, but there are still left stately pillars, to tell of its pristine glory. Our efforts after goodness, our admiration of that which is true, and just, and right; the joy experienced,—so exquisite, of doing good; the stern reproofs of a conscience, that has not been "seared as with a hot iron," when we have done wrong, are all proofs of our divine parentage, of our possessing a nature which is called in our text, "the Image of God;" a nature peculiar to man, and, as far as we know, not shared in by the lower animals. Mr. Darwin, however, thinks otherwise. He traces back to the lower animals, not only man's physical and mental constitution, but also his moral sense. Nay, in the devotion of a dog to its master he sees the germ of religion, of man's sense of the spiritual, of his worship of the Supreme. It will not be surprising to find that his arguments and facts in support of this opinion are both few and unsatisfactory. He says, "The following proposition seems to, be in a "*high degree probable*,"—observe, he starts with what he considers probable,—"namely, that any animal what—"ever, endowed with well marked social instincts, would "*inevitably* acquire a moral sense, or conscience, as soon "as its intellectual powers had become as well "developed, or nearly as well developed, as in man."¹⁴ Again, as so often before, have we to pause and ask for evidence. That man possesses a moral sense

¹⁴ Descent of Man. Vol. i., p. 71.

we have seen ; but where is the animal lower in the scale of being that has intellectual powers "nearly as well developed, as in man"? Until we have some proof that such creatures have been, or are, it is vain for us to speculate as to what may possibly be developed from their intellectual powers. Our author places the foundation of our moral nature in "social instincts." At the same time he says "the very essence of an instinct is that it is followed independently of reason." Now if what I have said about the real nature of a moral action be true, then we cannot believe it to be merely instinctive, and independent of reason. There must be a perception of right and wrong, and we must be urged on by a sense of duty. Again, "social instincts" may prompt to the doing of beneficial acts, but these are not necessarily moral. "Benevolent habits may make the doing of beneficial acts pleasant, and their omission painful ; but these feelings have essentially nothing whatever to do with the perception of right and wrong, nor will the faintest incipient stage of the perception be accounted for by the strongest development of such sympathetic feelings. Liking to do acts which happen to be good is one thing ; seeing that actions are good, whether we or others like them or not, is quite another."

But, further, if the social instincts were really the basis of our moral sense, then that moral sense would approve of what society approves. But is it so? Look at the different way in which society and our moral nature regard truthfulness. As Mr. Wallace says, "In society no very severe reprobation follows untruthfulness. In all ages and countries falsehood has been thought allowable in love, and laudable in war ; while in the present day it is held to be venial by the majority of mankind, in trade, commerce and speculation." And yet, does not our moral sense

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condemn falsehood, although it may be allowed in society? With due deference, I venture to think Mr. Darwin has mistaken the notion of morals, and so is reasoning on false premises. In one sentence: he seems to be rather playing with the word "ought." "We hardly use the word *ought* in a metaphorical sense when we say hounds ought to hunt, pointers to point, and retrievers to retrieve their game. If they fail thus to act, they fail in their duty, and act wrongly."¹⁵ Were the sportsman to say that he *ought* to go out with his gun on the 1st of September, few of us would condemn him, as having broken the moral law, in his omitting to do so.

In conclusion, Mr. Darwin, in this his latest work, candidly acknowledges himself to have been wrong in several points. He considerably modifies his views as to the origin of species. The most important links are wanting in the chain of development, and these he supplies from his imagination. He argues about what may have taken place in some unknown region, at some unknown time, and among some unknown creatures. And, lastly, he founds morality in instinct, and not in reason. For these reasons, he seems to me to have failed, and that completely, in establishing the theory of the evolution of man and his noble faculties from the lower animals; and our confidence in Mr. Darwin as our philosopher and guide is shaken.

When we look at man, capable of standing erect, his head having not only a lateral but an upward movement, so that he can scan the starry expanse; with hands able to make and use tools; with an artificial articulation, by which thought is clothed in speech; with instinctive and certain intellectual faculties in common with the lower animals, but in addition to these, the sole possessor (so far as we know)

¹⁵ Descent of Man. Vol. I., page 92.

of self-consciousness and the power of abstract reasoning; with moral faculties, which regard as praiseworthy in himself those very attributes which the Creator has displayed in nature and revelation as belonging to Himself; when we see the greatest living authority failing to allege any valid reason that should lead us to accept his theory of the evolution of man from the lower animals, our belief that the creation of man was not *derivative* but *immediate* is greatly strengthened; and we see no reason for regarding the words of my text as a grand old Hebrew legend: "And God said, let us make man in our image, and after our likeness; * * * so God created man in His own image, in the image of God created He him: male and female created He them."



LECTURE III.

VITALITY—IS IT A PHYSICAL FORCE ?

“ The Spirit of God hath made me, and the Breath of the Almighty hath given me life.”—Job. xxxiii., 4.

We have now to consider the deeply interesting question, What is Vitality ? What is Life ? As we have been standing in the solemn presence of death, have we not sometimes felt a mysterious wonder at the sudden and irrevocable change which has passed over the form lying before us ? But a short time ago those cheeks glowed with the bloom of health, the merry laugh rang like music through the house. There are the eyes, but the brightest sunbeam awakes no sensation; the ears, but they are deaf to our cries; the lips, but oh ! how silent ! the heart, but it throbs not. The form seems to be rather in the embrace of repose, than in that of death. But no ! the house is deserted, the tenant has departed, life has fled. What then, is the life, without which our bodies are but inanimate masses of matter, but with which we are sentient beings ? To this modern science replies, We observe certain mighty forces operate on matter, such as motion, electricity, magnetism, chemical affinities ; that in addition to these, in living matter, we see another energy, which we may call Vital Force ; but that, as in living matter we find no element which is not also in not-living matter, we have no reason to suppose that this vital force is anything but a correlation of those physical phenomena which are manifested in all matter.

Mr. Huxley puts the case very clearly : he says, “ When hydrogen and oxygen are mixed in a certain

" proportion, and an electric spark is passed through
 " them, they disappear, and a quantity of water, equal
 " in weight to the sum of their weights, appears in their
 " place. The phenomena presented by water we call
 " the properties of water; and we do not hesitate to
 " believe that, in some way or other, they result from
 " the properties of the component elements of water.
 " We do not assume that a something called 'aquosity'
 " entered into and took possession of the oxide of
 " hydrogen, as soon as it was formed, and then guided
 " the aqueous particles to their places in the facets of
 " the crystal, or amongst the leaflets of the hoar-frost.
 " * * * What justification is there, then, for the
 " assumption of the existence in the living matter of a
 " something which has no representative or correlative
 " in the not-living matter which gave rise to it?
 " What better philosophical status has 'vitality' than
 " 'aquosity?' * * * If the properties of water may
 " be properly said to result from the nature and
 " disposition of its component molecules, I can find no
 " intelligible ground for refusing to say that the
 " properties of protoplasm result from the nature and
 " disposition of its molecules!"¹

Whatever Professor Huxley says is worthy of our
 closest attention. Let us not shrink from, but fairly
 examine this reasoning, and see whether our intellects
 can accept it or not.

Now we find that living beings present to our
 observation both physical and vital phenomena. We
 will look at each of these.

I. *Physical Phenomena.*—These are essential to
 life, but differ in no way from those exhibited by

¹ Lay Sermons, page 149. By protoplasm, I understand
 is meant, the clear, semi-fluid substance, which under the most
 powerful microscope exhibits no sign of structure, and which is
 the most elementary form of living matter.

inert matter. There are the processes of imbibition and of endosmose, chemical changes, "elasticity, "gravity, hydraulic, optical and acoustic phenomena." Further, we observe that by friction,—that is, arrested motion,—heat is produced, and, conversely, heat produces motion, as seen in expansion.² The friction of two dissimilar substances produces electricity and heat; and by certain arrangements electricity can be made to issue in heat, motion, light and chemical changes. Not any one of these forces is the *cause* of another, but there is an interplay among them; the one passes on and is continued into the other. Thus, in arrested motion the force is not lost, but assumes another form, namely, heat. This interchange of the forces one with another is called "the correlation of the physical forces." How the mutual dependance of these physical forces is maintained in its integrity in living beings, they in this respect differing in no way from non-living matter,—what this many-sided energy is, we cannot tell; we only know it as a manifestation of Divine Power. The word "force" merely veils our ignorance; it appears definite and precise, but in reality is only a cloak thrown over our ignorance. We know by its manifestations such a force exists; what it is we cannot say. We must take care therefore not to be misled by a name. The infidel may confidently point to these mighty forces in nature which change, mould, consolidate, and modify matter, and triumphantly exclaim "Have we not here *physical* causes for things as they are?"

Our ideas of causation are often most confused. When yonder sluice is opened the water of this lake will flow out. Most people will say the water flows because the sluice is opened. But is it

² Vide Outlines of Physiology.

so? does not the water flow by reason of the law of gravitation? So we often, in our ignorance, attribute to secondary causes that which is essentially *the* cause. Again, we are accustomed to say, if certain conditions invariably follow certain conditions, they are related as cause and effect: again, I ask, but is it so? Night invariably follows day, but we do not say day is the cause of night. Motion produces heat, but motion is not the *cause* of heat. If it be, we find that heat also produces motion; then we have the cause producing the effect, and this in its turn producing the cause, which is as absurd as to suppose that a man can be at once his own father and his own son.³ If there be physical laws, they had a Promulgator; and He, and not they, is the Cause of physical phenomena. Push back the finger of a Creator as far as we may in the abyss of time, we are inevitably led to the Will of God as Causation, and the creative act of God as the potential energy which issues in its effects.

But, granting that the Almighty is the Originator of all physical phenomena, may not vitality be the product of the working of nature's laws? May not life belong to certain matter, just as fluidity belongs to water at a certain temperature? The hypothesis of Natural Evolution is that our world is a mass hurled from the body of the sun; and this idea is supported by the revelation of the spectrum, which shows that several of the terrestrial elements are found also in the sun; that the mass gradually cooled and condensed into a body externally covered with a crust; that in due time, under favouring circumstances, of heat, and moisture, and chemical action, molecules joined molecules, and formed bodies which evinced vital action; and that these gradually advanced from

³ *Vide* Grove's "Correlation of Physical Forces," p. 11.

simple to more complex bodies, until at last the majestic forests of the vegetable world appeared, and the almost infinite gradations of the animal developed into man—the culminating glory of the theory of Evolution. In the graphic but startling words of Professor Tyndall, “Not alone the more ignoble forms
“of animalcular or animal life, not alone the nobler
“forms of the lion and the horse, not alone the exquisite
“mechanism of the human body, but the human mind
“itself—emotion, intellect, will, and all their phenomena
“—were once latent in a fiery cloud.”

The newest theory is that of Sir W. Thompson, who, in his opening address to the British Association of Science, a few weeks ago, in dealing with the question of the Origin of Life, said that there is no doubt other planets have been and are peopled with life—that we know as a fact vast masses of matter are constantly coming into contact, and being broken into fragments, some of which are fused by the impaction, whilst other pieces, laden with seeds, and even animals, may have fallen on our earth; so that we have to look for the origin of life here amidst the wrecks of ruined planets. He says, “Is it not possible, and if possible, probable, that
“the beginning of vegetable life on earth is to be
“explained in this way? The hypothesis that life
“originated on this earth through moss-grown fragments
“from the ruins of another world, may seem wild and
“visionary; all I maintain is, it is not unscientific.” Unfortunately it is not unscientific. For it seems to me, there is no theory, however baseless, no speculation however gratuitous, no hypothesis however ethereal, that modern science will not tolerate, with this one proviso—provided it receives no countenance or support from Divine Revelation.

To return to the doctrine of natural evolution; let us suppose that physical laws, assisted by favouring

circumstances, have at last produced an organism possessed of vitality; let us grant to this organism a nervous centre, and nerve filaments proceeding from and to this centre—and surely these are enormous concessions—how are we to account for the development of the special senses, and of many of the complex organs of the body? We all know that sound is produced by the vibrations of the atmosphere striking on the tympanum of the ear, the influence of the vibrations being communicated to the nerve of hearing. By what natural law was a particular nerve filament converted into a nerve of special sense in the first instance? How? Why should vibrations in the atmosphere make known the presence of sonorous bodies to nerves which had no special adaptation for such impressions? And if we turn to the eye, can we conceive that light or any other physical agent could possibly, in the first instance, bestow the faculty of sight on any nerve-cell? This is scarcely the place or the time to enter into a minute description of the internal structure of the eye or the ear. I can only say that I can scarcely imagine a person studying this subject carefully, and observing especially the adjustment of these organs into pairs, and then not scouting the theory of natural evolution as a groundless fable.

I said that living beings present to our observation both physical and vital phenomena. Let us now turn our attention to

II. *The Vital Phenomena.* A living body may be likened to a vast city, whose streets, like those of Venice, are canals. Along these streams supplies are incessantly borne, from which each householder, each cell, takes only that it needs—the nerve-cell phosphorus, the bone-cell lime, the air-cell oxygen. And as a city remains, though one generation of its inhabitants succeeds another, so in the body the cells grow, mature,

decay, die ; and yet it remains, and it retains its identity. As Professor Tyndall beautifully says, "Like changing sentinels, the oxygen, hydrogen, carbon, that depart, seem to whisper their secret to their comrades that arrive, and thus whilst the non-ego shifts, the ego remains intact."

If we notice a simple organism, we find that it takes in pabulum from without, that it changes this into structure identical with its own, and that it divides, so that from one many are produced. Precisely the same thing goes on in every organism, in even the most complex and advanced. These properties of assimilation, growth and reproduction, are vital, and are in no way analogous, as far as we know, with any physical operations. But Professor Tyndall thinks that the development of a grain of corn is analogous to the formation of a crystal, and that both are effected by precisely the same molecular changes. The difference, however, between the two seems to me striking and well-marked. In the case of the crystal, the crystallizable salt must be present in the solution ; no chemical action is necessary ; whereas the cell, as if it were an intelligent chemist, selects those elements or compounds which it requires for its use, and according to the laws of chemical affinities, changes them into what they were not. The crystal increases, the cell grows ; the first by accretion, by the superposition of crystal upon crystal, the second by assimilation. The crystal may be redissolved, and then reformed ; a living cell cannot be dissolved, and when once dead cannot be remade. A cell may die and then be dissolved, but this is very different from dissolving living matter.

Without going fully into the subject of germination, let us very briefly notice some of the chemical changes which take place in the development of a grain

of wheat. The store of nitrogenous matter becomes gradually altered under the effect of heat, moisture and air; some of the fibrin is changed into a ferment called diastase; acetic acid is formed, and insoluble starchy matter is converted into two kinds of sugar, which are soluble. Carbonic acid is formed, and by this chemical action, heat is evolved. There is probably electric disturbance.⁴ Not only so: experiments show that in the process of germination water is actually decomposed into its component gases.⁵ We fail to discern any analogy to these mighty changes, effected by vital forces, in the development of a grain of wheat, in the formation and increase of a crystal.

Further, we see in these vital phenomena of appropriation, assimilation, growth and multiplication, a formative or constructive power, and this almost assures us that there is in vitality no correlation to the physical forces. Heat may move, but cannot make a machine. Force has no constructive power. Is the man who makes an engine a correlation of the heat that sets it in motion?⁶ The fact is, vitality is a master builder, and the physical forces are the tools with which he works; they are the chisels with which the artist strikes out from surrounding matter the glowing forms of life.

Another distinctive peculiarity in vitality is, that it does not, so far as we know, pass into any other force; it ceases at death. We have seen that in nature there is a conservation of force, that motion when arrested develops into heat. We cannot see anything of this kind in vitality. In this respect, therefore, we see how strikingly it differs from the ordinary physical

⁴ Balfour's Botany, page 631.

⁵ Lindley's Botany, page 360.

⁶ *Vide* "The Mystery of Life." By Dr. Lionel Beale, in Contemporary Review.

forces of nature. When a body dies, its parts do not die simultaneously. The heart may continue to beat for six minutes after the lungs are dead. And even long after the heart is dead, the cilia, that give the velvety appearance to some of the surfaces of the body, continue to exhibit signs of life. When seen in numbers, their movements are so rapid that we cannot see their peculiarities; they resemble a field of corn agitated by the wind. When the vitality is diminished, we see their lashing movement. Death takes place from the base to the tip; the base becomes motionless; gradually the movement becomes fainter, until it is seen only at the extremity; and at last motion ceases here also. The body is then dead. The resistance maintained during life against destructive agents now expires, and the body becomes subject to the physical laws which act on inert matter.

We will return for a moment to Professor Huxley's illustration. "Water has its own peculiar properties, "and yet we do not speak of the 'aquosity' of water. "So we find an organic compound possessed of its own "peculiar properties. Why then should we speak of " 'vitality' as a property not inherent in, but "independently bestowed on this new compound?" To this I would reply: its properties are essential to water; vitality is not essential to protoplasm. Professor Huxley himself speaks of dead protoplasm. No one could think of water deprived of its "aquosity."

I have thus endeavoured to show that vitality is not a correlative of the physical forces, and that we cannot regard it as a simple or single force. On the contrary, we find it exceedingly complex, being made up of the sum of the activities of both physical and vital phenomena. What that force, or those forces, are which are peculiar to living matter, and which are therefore called *vital*, we cannot as yet determine.

They seem to be essentially different from the known physical forces, and so will, perhaps, for a long time elude the chase of investigation.

With respect to the doctrine of Spontaneous Generation, its very name is a misnomer. It does not mean that the genesis of living beings from non-living matter is fortuitous or accidental, but that, in strict accordance with certain physical laws, some minute creatures in the lowest scale of being come into existence without the intervention of pre-existing parents. Biologists at the present time are earnestly examining into the subject, and I may add, the accumulating evidence renders it nearly certain that all living creatures are the offspring of pre-existing living matter.⁷ And if nature's laws cannot now originate life, what reason or right have we to guess that, at some indefinitely remote period, they could? We are accustomed to speak of the unvarying character of nature's laws, of their inevitable fulfilment. Were they then interrupted? We ask for evidence of this miracle. But even granting that life appeared, how are we to account, by any physical law or force, for the origin of such delicate and intricate organs as the eye and ear; and for the duality of these and other organs in living beings? On these points, it seems to me, science is absolutely dumb. It has no word to utter, and so we are compelled to fall back upon the statement of Holy Scripture, that life is not inherent in any matter, that it is not the resultant of any physical

7. The opponents of the doctrine of spontaneous generation maintain that the minute creatures which appear in infusions of any organised substance, and which are called vibriones and bacteria, are the offspring of germs in the air. The latest experiments,—those of Dr. Bastian, prove that there are germs in the atmosphere, but they also shew that the vibriones appear when the infusion is *in vacuo*. If these experiments be confirmed, then the atmospheric-germ theory must be abandoned. I think sufficient attention has not been paid by investigators to the destruction by heat of any possible germs in the infusion itself.

force, or combination of physical forces, but that at a definite time it was infused into matter by a wise and beneficent Creator. "O Lord, how manifold are Thy works ! in wisdom hast Thou made them all ; the "earth is full of Thy riches. That Thou giveth them, "they gather. Thou openest Thine hand, they are filled "with good. Thou hidest Thy face, they are troubled ; "Thou takest away their breath, they die, and return to "their dust. Thou sendest forth Thy Spirit, they are "created ; and Thou renewest the face of the earth." "The Spirit of God hath made me, and the breath of "the Almighty hath given me life."

But, my hearers ! there are other important vital phenomena to which no allusion has yet been made. There are many living beings who possess other and subtler powers, to which we have not referred, and which it is still more difficult to ascribe to physics,—I mean sensation, intelligence, consciousness.

The whole body is invested in a network of nerves, the meshes of which are so minute, that we cannot insert the point of a needle into any part without wounding a nerve. An impression is made ; the influence of this impression is conveyed, in some mysterious and unknown way, along the nerve to the brain. We there *feel* the influence, and this is called *sensation*. So that we feel pain, not at the point of the wound, but in the brain. If the attention of the mind be called to the sensation, then we become *conscious* of it. Sensation always precedes consciousness, and there may be sensation without consciousness. If we reflect on the causes or the consequences of the wound, and resolve to adopt the proper measures for avoiding the danger in future, then we are *thinking*. But what is thinking ? the brain or the mind ? What is the *I* that thinks ? All agree that the materials for thought, external to self, are conveyed, so to speak, by the

nerves of sense to the brain ; and that the brain is an organ which affords the necessary conditions for the *manifestation* of thought. But the question is, Is the brain an originator or an instrument ? Does it originate thought, or is it like a piano played upon by a pianist ? The vital function of the liver is to secrete bile ; in the same way, and in the same sense, is it the function of the brain, so to speak, to secrete thought ? Do the non-sentient molecules of which the substance of the brain is composed, influenced by chemical, electrical, and other physical laws, issue their mandates to the rest of the body, directing and controlling its movements and multiform operations ? Do those senseless particles inspire the poet in his loftiest flights, and the philosopher in his profoundest speculations ? Do they guide the hand of the artist, who makes the sculpture all but speak, and the canvas all but breathe ? Are these minute nerve-cells the birth-place of our noblest aspirations after goodness, of our belief in the infinite, of our assurance of immortality ? Or are they the point where physical and psychical meet, where body and soul come into contact, so that the brain is like a majestic organ, which cannot of itself discourse sweet music, but whose parts are so excellently arranged, that when the keys are touched by the skilled performer, the very air trembles in its sonorous tones, and whilst we distinguish between the organ and the player, we are lost in admiration at both the instrument and instrumentalist ?

Some light might be thrown upon this difficult question if we only knew what change, if any, takes place in the minute structure of the brain at the moment a sensation is awakened. But we do not know how an impression is made upon a nerve ; nor how a nerve conveys the influence of the impression made. We do not even know how a nerve filament

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terminates in a nerve-cell, much less how the influence conducted impinges on a nerve-cell and excites sensation. Professor Tyndall thinks that for "every
 " fact of consciousness, whether in the domain of sense,
 " of thought, or of emotion, a definite molecular condition
 " of motion or structure is set up in the brain," so that
 " given the state of the brain, the corresponding
 " thought or feeling might be inferred ; or, given the
 " thought or feeling, the corresponding state of the brain
 " might be inferred." But even granting such to be the case, these phenomena do not unravel the difficulty ; they merely tell us that such and such changes are accompanied by consciousness, but tell us nothing of the "how" or "why." As Tyndall says, " Let the
 " consciousness of *Love*, for example, be associated with
 " a right-handed spiral motion of the molecules of
 " the brain, and the consciousness of *Hate* with a left-
 " handed spiral motion. We should then know, when
 " we love, that the motion is in one direction, and when
 " we hate that the motion is in the other ; but the
 " ' why ' would remain as unanswerable as before." This idea—that molecular changes take place in the brain each time we think, or feel a sensation, has arisen from the supposition that nerve force is identical with, or closely allied to electricity. That it is not the same, I think it is not difficult to show. We are accustomed to say " as quick as thought " ; but the fact is, thought is not that instantaneous operation which we are apt to imagine. Nerve force travels comparatively slowly, not more than about 90 feet per second, that is, eleven times more slowly than sound is propagated ; whilst light travels with the astounding velocity of 185,000 miles per second. If a whale 90 feet long were wounded in the tail, it would require one second for the influence to be conveyed to the brain, about the tenth of a second for the brain to take cognizance of it, and another

second to convey the mandate to repel the attack. Again, if a nerve be tied across tightly, electricity will pass through the ligatured part, but not nerve-force. Other facts might be brought forward, but these two are sufficient, I think, to prove that nerve force is not identical with electricity. So that the inference that when thought is awakened, the molecules of the brain are in motion, because the atoms of a telegraphic wire are in motion when a message is being conveyed, is nothing more than a hypothesis to which existing facts lend no support. But even granting the hypothesis to be true, again I say, it tells us nothing of *why* such molecular changes result in consciousness.

Let us clothe a bony framework in its fleshly garments; let us pour into this the rivers of life; let us connect the periphery with the capital—the brain; heat, motion, electricity, will be developed; but will any one of these,—can they altogether, give rise to sensation? Can they account for that introspection, that reflection, which takes place in the mind, independent of all sensation from external objects? Can the microscope, the scalpel, the balance, the re-agent, tell us anything of these? The fact is, to attempt to account for psychological phenomena by physiological explanations, is as futile as it would be to explain the laws of chemistry by those of philology. For these reasons we conclude that sensation, our emotions, thought, consciousness, are purely vital, and not in any way correlatives of the physical forces.

And this view is confirmed when we consider, that as we are conscious of it, we know we exist, so this consciousness constitutes our *personal identity*. "For, upon reflecting upon that which is myself now, and that which was myself, say, 20 years ago, I discern they are not two, but one and the same self!"⁸

8. Butler's Sermon on Personal Identity.

The persistent and continuing Ego is merely enshrined for a time in the body—in matter—in the Non-Ego. We know that the materials of which the body is built up are in a state of constant change. Our minds are now attached to matter, not one atom of which existed in our bodies ten years ago. Still, with this unceasing march of change in the body, consciousness continues a changeless self. And it is this persistency of personal identity, in spite of the fleeting and vanishing atoms of the body, in the midst of which it manifests itself, that suggests the more than probability that consciousness is an entity,—the soul—a something independent of and differing from brain substance, and all other matter. And, as we see that this entity is not affected by the dissolution of matter, analogy would lead us to suspect it to be immortal.

We now bring these lectures to a close. In examining into the theory of natural evolution we find such serious and important gaps in the evidence, which are filled in only by imagining what may have been, that we cannot feel justified in accepting the theory without further evidence. We find no facts to show that the lower animals have any moral sense, that is, that they do a thing because of its rightness, and because they *ought*. Much less are there any traces in them of religious faculties, that is, the conception of the spiritual. And, lastly, we find vitality exhibiting phenomena so totally different from any physical force, that we cannot believe it to have been evolved from any one, or all, the physical forces.

The province of science is to interrogate and investigate the manifestations and operations of the Creator in nature. But, because the evidence for metaphysical, psychological, and theological truths cannot, from the

very nature of these sciences, be demonstrated to the senses, this is no reason why the "worshipper of the severe truthfulness of science" should contemptuously flout such truths away. The philosopher rises to the height of wisdom, when, in distrust of his own feeble powers, he acknowledges there may be truths not dreamt of in his philosophy. Nor, on the other hand, can the theologian neglect or ignore the ascertained facts of science. Truth is one, and is like the diamond which flashes divers hues from its many facets. If Christianity appear to be antagonistic to philosophy, it is only to "philosophy falsely so called." She hails with radiant joy every new-won fact in science, as a new revelation of the wisdom and power of the Almighty. She joins in the triumphal march of intellect, and chaunts her strains of praise. "Praise ye the Lord. Praise God in His sanctuary, praise Him in the firmament of His power. Praise Him for His mighty acts; praise Him according to His excellent greatness. Let every thing that hath breath praise the Lord. Praise ye the Lord."

In conclusion, we must remember that we are responsible for our own opinions, and that if Darwin and Huxley, and Tyndall, are to be the apostles of our faith, it must be only after a crucial examination into their tenets. Standing at the foot of the Cross, I would point you to Another, Who claims your affections, your faith, your devotion; and would re-echo those words of His, addressed to each one of you, "Follow me." My hearers! What is Christ to you? a mere historical personage? a noble hero, and nothing more? or a Friend, a Saviour, in whose atoning blood you trust, and whose holy example you strive, both as a privilege and a duty, to follow? It is mere poetry that tells us nature leads us up to nature's God. Nature may teach us to wonder, and admire, and fear; but it can never teach us to love.

It is the character of God, as revealed in His Holy Word, that changes our wonder into ardent love. Some substances have the power of absorbing rays of light, and so, as we gaze and gaze at the character of God, as revealed in Christ Jesus, the Sun of Righteousness, some of its bright beams may flash into our souls, and even abide there.

May God help by His Spirit each one of us to become the meek and lowly follower of Christ our Saviour. Let us pour the affluence of our love, and all we love, at the feet of Jesus. Let us mistrust our own powers. Lord, we are weak, be Thou our Strength ; we are dark, be Thou our Light ; we are ignorant, be Thou our Wisdom. And if our intellect too boldly puts forth its claims to be our guide, let us feel that we are in His Presence ; and so, like the Cherubim and Seraphim, veil it in humility.



